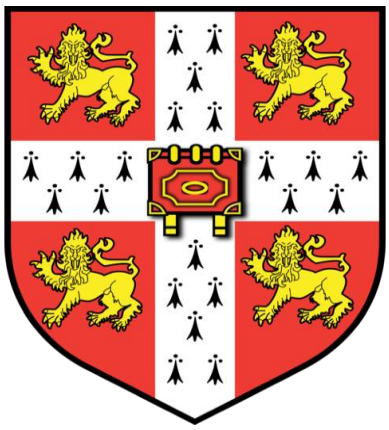
Elements Shaping the South African Education System of the Future



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Preface

This dissertation is the result of my own work and includes nothing which is the outcome of work done in collaboration except where specifically indicated in the text.

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Acknowledgements

I am exceptionally grateful to my sponsors, The FirstRand FNB Fund, for making this year and this research possible. I would like to thank my family for their unwavering support. To the course team and 2018/2019 Engineering for Sustainable Development cohort, thank you for the many new ideas, experiences, conversations and friendships. Special thanks to Dr Björn Haßler for his guidance through this process, and to Dr David Morgan for his boundless empathy.

Abstract

The South African education system is deeply unjust because a child's place of birth, skin colour and family's income largely determine their educational attainment. Understanding future trends and developments can assist stakeholders in planning and decision making. Better decisions could ultimately improve the education system. Therefore, this study aims to answer three questions: What trends are likely to impact the South African education system? What opportunities and threats arise due to these trends? Which actors are best placed to react to these opportunities and threats and could influence the system?

To address these questions, a sequential mixed-method approach was adopted. First, conceptual systems diagrams were developed to depict the current education system and its stakeholders. Then, semi-structured expert interviews were used to identify future trends, threats and opportunities. The results of the two previous phases were synthesised in the last phase.

This study found that the trends impacting the South African Education System broadly align with global trends. Examples include an increase in privatisation, technology in schools and climate change. Compared to global trends, more violence in schools is the main outlier. This study found that the risks related to technology and climate change are being recognised but not planned or accounted for. Similarly, tackling violence in schools is currently not a priority. This study also found that participants agreed on who the major stakeholders are, but disagreed on what actions stakeholders should take.

Impact Statement

Achieving quality education for all is the United Nation's fourth Sustainable Development Goal. Education represents a massive opportunity to achieve equity. A well-functioning state-owned education system can ensure that all children, irrespective of background, have similar opportunities to succeed. The purpose of this research is to assist stakeholders in the South African education sector in improved decision making. A novel systems overview and a summary of the key trends that could impact education in the future are presented to fulfil this objective.

Beneficiaries of this research include the South African Department of Education, teachers' unions, teacher professional associations, NGOs, the private sector and school leaders. Should this research lead to improved decision making, secondary beneficiaries include teachers, pupils and parents. The results of this research will be shared with all the participants and this report will be published in the Cambridge open access repository as well as the public Zenodo archive (DOI: 10.5281/zenodo.3370973)[1].

I consider myself another beneficiary of this research. Beyond exploring the South African education system from multiple perspectives and learning new skills in qualitative research methods, I had the opportunity to engage with stakeholders working in the sector. Most importantly, this research will guide me in my future career decisions.

The findings of this research can be built on in various ways. The identified trends could be quantified to assist the state in, comprehensive, medium- and short-term planning. The causal loop approach, as applied to this problem, has further potential, particularly in policy dialogue. Lastly, the findings of this research will hopefully foster conversation between stakeholders, resulting in enhanced decision making and planning.

[1] This follows recommended best-practice for publishing in the development sector c.f., Haßler (2018)

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Acronyms and Abbreviations

ANC	African National Congress
CLD	Causal Loop Diagram
DOE	Department of Education
DHET	Department of Higher Education and Training
ECD	Early Child Development
NPC	National Planning Commission
NDP	National Development Plan
NSC	National Senior Certificate
OECD	Organisation for Economic Cooperation and Development
PDE	Provincial Department of Education
SACE	South African Council of Educators
SACP	South African Communist Party
SADTU	South African Democratic Teachers Union
SDG	Sustainable Development Goals
SGB	School Governing Body
UK	United Kingdom
UN	United Nations

1 Introduction

The South African Constitution declares education to be a basic human right (South African Government, 1996a). The government of South Africa also subscribes to the United Nations ("UN") Sustainable Development Goals ("SDG"). The SDGs were adopted by the UN's General Assembly in 2015. The fourth SDG aims to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" (United Nations, 2018).

25 years after the end of apartheid, the South African Education System is still unjust. 78% of children can not read for meaning at the end of grade 4 (Spaull, 2017). 40% of children drop out of school before they complete grade 12 (Hofmeyr et al., 2017). In the current system, a child's place of birth, skin colour and family income largely determine their educational attainment (Spaull, 2019).

In improving the education system, stakeholders face many uncertainties that hamper decision making, diminishing improvements in learning outcomes. Understanding possible future trends that could impact the South African education system, can assist stakeholders in planning and decision making. Therefore, this research aims to answer the following questions:

- What **trends** could impact or change the South African education system?
- What **opportunities and risks** arise due to these trends?
- Which **actors** are best placed to react to these opportunities and threats, and could influence the system?

1.1 Scope

This research is limited to the future of basic education and a time horizon of 10-15 years from 2019 onwards. Basic education is defined as Grade 1-12 (age 7-18). Teacher pre-service and in-service training is included. This research considers social, environmental, political, economic and technical developments and excludes all health considerations.

1.2 Structure

This dissertation consists of 6 sections. First, an overview of the South African education system is provided. This is followed by a literature review of trends impacting education globally. The methodology is presented next. The results, discussion, and conclusions are presented last in sections 4, 5 and 6, respectively.

2 Background

This section provides a brief overview of the South African education system. A summary of the major education reforms implemented during and after apartheid is presented first. This is followed by an overview of the period between 1994 and 2019 and a description of the current state of the system. The section ends with a view of the future.

2.1 Education Reforms in South Africa

The abolished policies of the apartheid regime still shape the South African education system today. The promulgation of the Bantu Education Act in 1953 resulted in large-scale educational reforms. These included i) the shift of control of black missionary schools from churches to the state; ii) the massification of schooling; and iii) the division of education along racial lines (SA History Online, 2016; Union of South Africa, 1953).

During apartheid, financial and human resources relating to education were unevenly distributed, resulting in vastly different school facilities, teacher training, and learning outcomes. Per-child spending heavily favoured the white minority population and white teachers were trained in well-resourced teacher training colleges. Conversely, all non-white communities were tasked with setting up their own teacher training colleges with limited support from the government. For further details on the history of teacher training in South Africa see Wolhuter (2006).

When apartheid ended in 1994, the education system underwent large-scale changes. These include: i) the collapse of ethnical education departments into a single Department of Education; ii) the introduction of School Governing Bodies; iii) the equalisation of per-child government spending; and iv) the provisioning of fee-paying public schools.

This subsection provided an outline of the educational reforms implemented in an after apartheid. Details of post-1994 educational reforms are provided next.

2.1.1 Department of Education

The now unified Department of Basic Education (“DBE”) plays an important oversight and control role. The DBE focuses solely on schooling. It determines national policy, sets the

curriculum and oversees nine Provincial Departments of Education ("PDE"). PDEs are tasked with implementing policies and cascade this responsibility through circuits, districts and ultimately schools (South African Government, 1996b).

2.1.2 School Governing Bodies

School Governing Bodies ("SGB") were introduced to disseminate decision making and empower school communities. Members of SGB include the principal and elected parents, teachers and pupils. SGB's responsibilities include: i) determining school fees; ii) managing the school's finances; iii) recommending the hiring of personnel; and iv) determining language, religious, and extra-curricular school policy (South African Government, 1996b).

2.1.3 Government Spending on Education

Government spending on education drastically changed at the end of apartheid. Previously unequal per-child spending was replaced with equal per-child spending. The South African government now allocates approximately 6% of GDP to education (UNESCO, 2019). Of this, approximately 80% of funds are used for teacher salaries, while the remaining 20% are allocated to non-personnel expenditure (UNICEF, 2018).

2.1.4 Fee-paying Schools

The provision for fee-paying schools has resulted in continuing unequal distribution of resources. The South African Schools Act makes provisions for independent schools and fee-paying public schools (South African Government, 1996c). Independent schools are fully privately funded independently managed institutions. As of 2016, 4.4% of learners attend independent schools, while the remainder attend public schools (DOE, 2018). Fee-paying public schools benefit from additional resources raised through school fees, while non-fee paying schools rely solely on government funding. School fees range from as little as R600/£33 per annum to over R150,000/£8,206 per annum[2] (de Villiers, 2019; Motala and Carel, 2019).

[2] Exchange rate as of 14 August 06:59 BST (Google Finance, 2019).

2.2 1994 - 2019

Since 1994 the DBE has attempted to overcome the inequalities left by the apartheid regime. Infrastructure spending favours disadvantaged schools, a school feeding scheme has been introduced and the curriculum has undergone extensive changes. Details of current national education programs can be found in the DBE's latest yearbook (*South African Yearbook: Education*, 2018). For an overview of South African curriculum reform see Muller and Hoardley (2019).

2.2.1 The DBE and Teachers Unions

In the last 25 years, the complex relationship between the African National Congress ("ANC") and the South African Democratic Teachers' Union ("SADTU") has shaped the education system. In 1990, the tripartite alliance was formed. Its members include: i) the ANC, South Africa's leading party; ii) the South African Communist Party ("SACP"); and iii) the Confederation of South African Trade Unions ("COSATU") (Twala and Kompi, 2012). SADTU is the second biggest union affiliated to COSATU and represents 59% of South African teachers[3]. The state and labour are thus tightly coupled, impacting policy and appointments. Examples of SADTU's influence on education policy include the abrupt halting of the annual national assessments and the cancellation of the performance-based-pay-increase policy proposed in 2008 (Gustafsson, 2019). The promotion of teachers and managers in the DOE has in some instances been influenced by SADTU (Volmink et al., 2016; Zengele, 2013).

2.2.2 Teacher Training

Since the end of apartheid, the institutions providing initial teacher training have been restructured and in-service training has been limited. The 180 teacher training colleges were collapsed into 24 universities (Wolhuter, 2006). Between 1994-2009 most in-service teacher training focused on specific teaching practices, to align these to the new curriculum. The DBE used a largely unsuccessful cascade model for implementation. Since 2009 large-scale change programs to up-skill teachers and improve learning

[3] Based on own calculation of 2016 teacher numbers and SADTU (2017).

outcomes have been rolled out in various provinces. See Shalem and De Clercq (2019) for further details. Coordination, management and funding of in-service training and upskilling have been largely disputed between the state and the unions. Both parties believe that the other should carry this responsibility. Therefore, many teachers who were poorly trained in the apartheid era remain in the system with little new training.

2.2.3 Teacher Professionalism

Teacher professionalism, a tenet of quality education, has been dominated and shaped by the education department and trade unions. The South African Council of Educators ("SACE") was established in 2000. SACE is an independent professional body that "aims to enhance the status of the teaching profession" and is tasked with managing the registration and continuing professional development of teachers (SACE, 2019). SACE's governing board consists mostly of DOE and union representative. Therefore, the board's independence is questionable (de Clercq, 2013). Other teacher professional associations exist, but do not compare in scope or breadth with SACE. Examples include the South African Principals Association, the Association for Mathematics Education of South Africa and the South African Association of Science and Technology Educators.

2.3 Education Today

As of 2016, there are 29,749 schools in South Africa serving 13.3 million learners, employing 440,151 teachers (DOE, 2018). Schools are split into primary (Grade 1-7) and high schools (Grade 9-12). Upon passing the school leaving examinations at the end of grade 12, learners are awarded the National Senior Certificate (NSC), also referred to as Matric. This is the only school leaving certification available in South Africa. Learners are required to pass a minimum of 4 subjects with over 30% and another 3 subjects, including a home language, with over 40% (Wedekind, 2013).

Even though universal primary school access has been achieved (UNDP, 2010), quality education for all remains elusive. The performance of South African pupils in international assessments provides an insight into learning outcomes achieved in primary schools. 78% of South African children can not read for meaning in any language at the end of grade 4, according to the latest Progress in International Reading Literacy Study (Spaull, 2017). 40% of grade 6 learners are functionally innumerate based on the 2011 Southern and Eastern African Consortium for Monitoring Educational Quality study (Spaull, 2013). The Trends in Mathematics and Science Study compares South African pupils' performance to the performance of pupils from other countries. On average, South African pupils performed worst in mathematics, and second worst in science, compared to all other participating countries (IEA, 2016a, 2016b).

The poor learning outcomes achieved in primary school have knock-on effects that result in high drop-out rates and low NCS pass-rates. An analysis of the children completing school in 2008 provides an overview: of the 100 children entering school in grade 1, 60 pupils wrote matric (40% drop-out rate before grade 12). Of these 60 pupils, 37 passed matric (37% throughput rate from grade 1 to Matric), and only 26 pupils achieved results high enough to enter tertiary education (Hofmeyr et al., 2017).

Continued differences in financial resources, teacher training and leadership capacity have resulted in a two-tiered schooling system (Spaull, 2019). Some schools have sufficient resources, well-capacitated school management and highly trained teachers. However, most schools have insufficient resources, and under-capacitated leaders and

teachers. Unsurprisingly, learning outcomes in these environments differ vastly: “the top 200 high schools in the country have more students achieving distinctions in Mathematics or Physical Science (80%+) (in the NCS examinations) than the remaining 6,476 high schools combined“ (Spaull, 2019). Today, the province of a child’s birth, family income and skin colour still largely determine their overall educational attainment (Spaull, 2019).

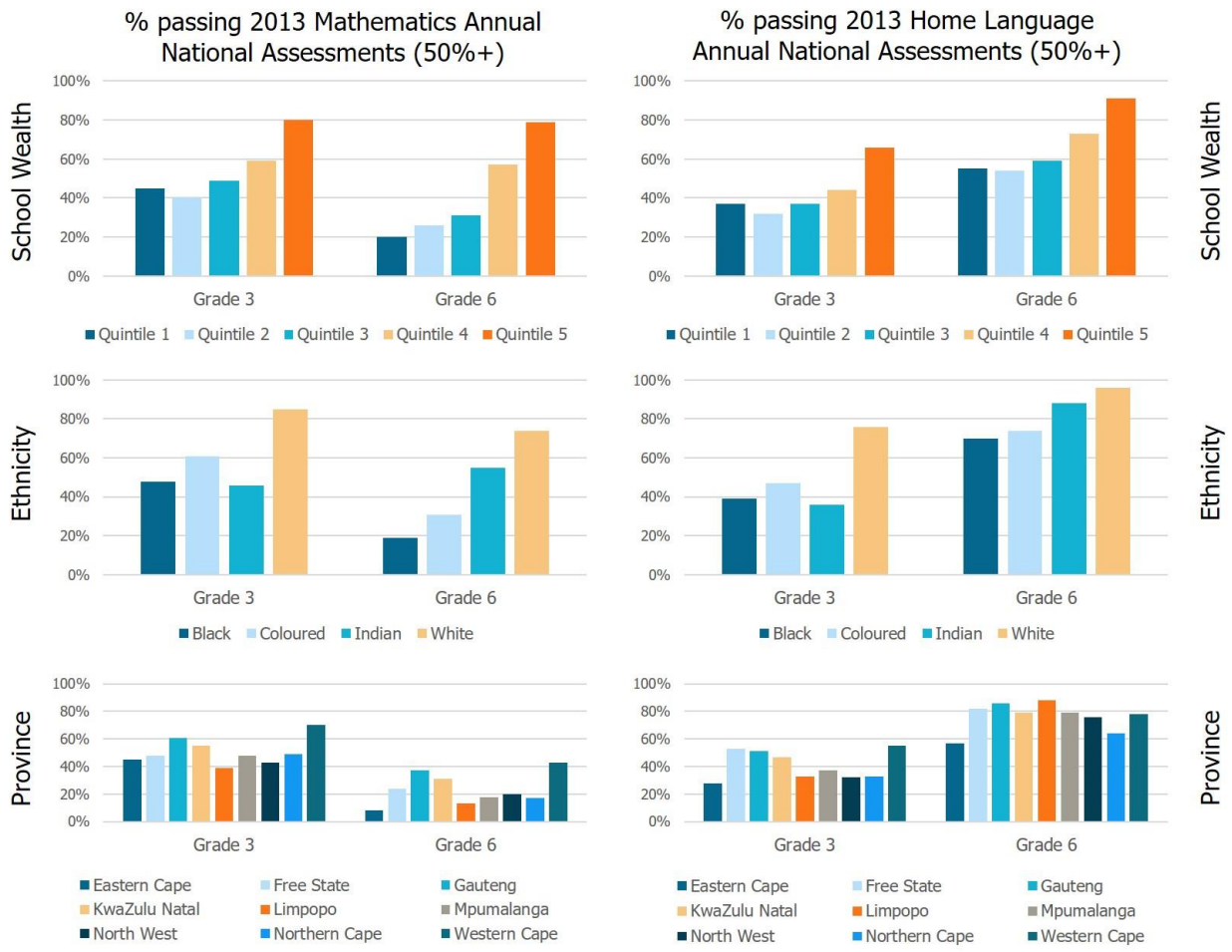

Figure 1: Overview of Learning Outcomes by Wealth, Ethnicity and Province (Spaull, 2019, p. 17)

2.4 Looking to the Future

Looking to the future, key focus areas are early grade literacy, early childhood development (“ECD”) and technology. Education policy is shaped by presidential and ministerial focus areas and the National Development Plan (“NDP”). The NDP, published in 2012, sets out a vision and roadmap for South African to 2030. The NDP is the guiding document for policy-making and planning and was developed by the National Planning Commission (“NPC”).

Early grade literacy is a major focus area. By 2030, the NDP sets out to ensure all children can read and write at the end of grade 3 (NPC, 2009), a goal echoed by President Cyril Ramaphosa in his latest State of the Nation Address (“SONA”) on 20 June 2019 (Ramaphosa, 2019). Improving foundation level literacy and numeracy is also one of the top five priorities for Education Minister Angie Motsheka (Motshekga, 2019).

Universal access to two years of ECD is another key priority. The NDP sets out to achieve this goal by 2030 and recommends that the responsibility of ECD is shifted from the Department of Social Services to the DBE (NPC, 2009).

Incorporating technology and preparing the youth for the jobs of the future is a third key priority, according to both President Cyril Ramaphosa and Minister Angie Motshekga. The President and the Minister noted that subjects like coding and data analytics will be implemented at the primary school level (Motshekga, 2019; Ramaphosa, 2019). Additionally, a new curriculum stream, focusing on vocational training, will be implemented. The broader framework for implementing technology in schools is presented in the draft white paper on e-education (South African Government, 2004).

Other focus areas highlighted by the Minister in her latest parliamentary address include: introducing standardised assessments and a General Education Certificate before grade 12; decolonising the curriculum and promoting African languages (e.g. incrementally introducing Kiswahili); and v) complete an integrated infrastructure development plan (Motshekga, 2019).

In this section, an overview of the South African education system has been provided. This demonstrates how the current education system is a product of South African history and introduces the most important elements of the system today.

3 Literature Review

In this section, an overview of trends impacting education globally is provided.

3.1 Futures Studies in Education

Futures studies, also called foresight, futurology or futuristic, are broadly based on postulating probable, possible and preferable futures and have been completed for over 50 years (Sardar, 2010). Traditionally, these studies have focused on economic or military developments and have recently shifted to broader themes, including education (Facer and Sandford, 2010).

Over the past 10 years governmental organisations, academics, charities and the private sector have launched or published a series of future studies linked to education. The Organisation for Economic Co-operation and Development ("OECD") issues a book on the trends impacting education in OECD countries every two to three years. The first book was published in 2008, with the most recent book being published in 2019 (OECD, 2019). Unwin et al. (2018) published a report on behalf of Save the Children (UK) on the Future of Learning and Technology in Deprived Contexts. In the United Kingdom ("UK") the Department of Children, Schools and Families commissioned an extensive foresight study into the future of education that was completed in 2010 (Facer and Sandford, 2010). In South Africa, a report on education scenarios to 2019 was developed for the President in 2007 (Taylor et al., 2007) and the NDP includes major trends that could impact South Africa in the next few years (NPC, 2009).

For ease of reference, the trends identified in the above papers have been grouped into social, environmental, political, economic and technological trends.

3.1.1 Social Trends

Social trends that could impact education include migration, changes in population size and composition, changes in family structures, increased inequality and child activism.

Migration

International mobility and migration have increased and are expected to rise further. Internationally the number of air passengers has grown from 300 million in 1970 to almost 4 billion in 2017 (OECD, 2019, p. 22). The number of international migrants has also increased steadily, increasing by 69% between 1990 and 2017 (OECD, 2019, p. 24).

Similarly, internal and international migration is expected to continue in South Africa. Internal, or rural to urban migration, is expected to continue, resulting in 70% of the population living in urban areas by 2030, a 10% increase from the 2009 baseline. International migration is expected to increase the population growth rate by between 0.1 and 0.2% each year until 2030 (NPC, 2009, p. 29).

Population

The populations of the UK and OECD countries are ageing. In the UK life expectancy at birth has increased. This combined with a lowering fertility rate is expected to lead to an ageing population (Facer and Sandford, 2010). The same trend is present in other OECD countries, with longer lives leading to the average time spent in retirement increasing to 20 years, and the proportion of active seniors increasing between 2006 and 2016 (OECD, 2019, p. 79).

In South Africa, the population size is stabilising, with birth rates falling. In 2009 the population was growing at 1% a year. Population growth is expected to decline to 0.5% a year by 2030 (NPC, 2009, p. 29). The labour force makes up 64% of the population, with both children and the elderly making up smaller portions of the population (NPC, 2009, p. 28).

Family Structure

Family structures are changing globally. Three examples cited by the OECD are the increase in the proportion of children born out of wedlock, the cumulative increase in

countries granting paid paternity leave, and the cumulative increase in countries prohibiting corporal punishment towards children (OECD, 2019, pp. 95–97). Additionally, the proportion of households inhabited by a single person has increased across most OECD countries (OECD, 2019, p. 77).

Increased Inequality

Global inequality is increasing. Although household income has increased for all households in OECD countries, the richest have disproportionately benefited from economic growth: “today the richest 10% of the population earns about nine and a half times the income of the poorest 10%” (OECD, 2019, p. 38). The proportion of wealth held in tax havens has also increased from 9% to 12% of GDP between 2001 and 2015 (OECD, 2019, p. 39).

Unwin et al (2018) foresee the inequality in learning increasing in deprived contexts. The education of children stemming from privileged backgrounds is likely to improve as they have access to enthusiastic and well-trained teachers that can adapt curricula, often through expensive private schooling. Conversely, state-funded education will continue to struggle due to insufficient resources, large class sizes and stressed, inadequately trained teachers.

Child Activism

Increased child activism linked to climate change may impact schools. The Fridays for Futures’ school strike originally started by Greta Thunburg has spread across the world, with hundreds of thousands of children participating across 1600 cities and 125 countries in a climate protest on 24 May 2019 (Gerretsen, 2019).

3.1.2 Environmental Trends

Environmental trends impacting education include climate change and pollution.

Climate Change

The NPC (2009), the OECD (2019) and Facer and Sandford (2010) note increasing global temperatures and an increase in the frequency of natural disasters as environmental trends. According to the NPC:

> "Emissions from carbon dioxide and other greenhouse gases are changing the earth's climate, potentially imposing a significant global cost that will fall disproportionately on the poor. Rising temperatures, more erratic rainfall and extreme weather events are likely to take a heavy toll on Africa, with an increased spread of tropical diseases and growing losses (human and financial) from droughts and flooding" (NPC, 2009, p. 33).

The OECD notes that "climate change is having an impact in terms of higher temperatures, rising sea levels and more frequent extreme weather events" (OECD, 2019, p. 62). Facer and Sandford (2010) scenarios are based on the assumption of a two degree increase in global temperatures.

Pollution

Pollution and waste are increasing. Air pollution is expected to increase. Air pollution has been linked to cancer and cardiovascular diseases, claiming up to 3.2 million lives already (OECD, 2019, pp. 62–63). Furthermore, with the rise of global consumption of electronic products, e-waste is increasing at alarming rates. In 2016, 45 million metric tons of e-waste were produced internationally of which a mere 20% was recycled (OECD, 2019, pp. 26–27).

3.1.3 Political Trends

Political trends impacting education include shifting power, changing civic engagement and changes in education.

Shifting Political Power

Globally, political power is shifting. The prominence of countries like India and China is increasing, with their global share of GDP increasing from 4% to 18% and from 3% to 7% respectively between 1990 and 2016 (OECD, 2019, p. 20). According to the NPC:

> "In decades to come, as emerging economies increase their share of world trade and investment, the relative decline in the economic weight of the United States, Europe and Japan will have concomitant effects on their political and military influence. This could lead to a reorganisation of the international diplomatic and governance architecture, reflecting new centres of influence" (NPC, 2009, p. 31).

The relative importance and representation of Africa may increase. According to the NPC:

> "The economies of many African countries have grown more rapidly over the past decade [...] and the continent has carved out a greater voice in global institutions" (NPC, 2009, p. 32).

Changing Civic Engagement

Civic engagement is changing. Average voting turnout has decreased from 75% to 67% between 1990 and 2010 in OECD countries. According to the OECD:

> "There are worries that they [voting trends] reflect a growing disaffection or apathy towards the political process and institutions, especially by the youngest citizens" (OECD, 2019, p. 40).

Additionally, access to digitised information is changing assumptions about civic participation and public deliberation. While access to information at low or no-cost has increased, the risk of misinformation and bias spreading has been amplified. The advent of social media has resulted in misinformation and "fake news" spreading rapidly, creating confusion about current events (Ordway, 2017). The introduction of search algorithms to

match a reader's interests together with social media platforms has also increased the likelihood of online communication taking place in echo-chambers in which pre-existing views are reinforced (OECD, 2019, pp. 40–41).

Changes in Education

In deprived contexts, Unwin et al. (2018) foresee: i) the continued slow pace of change in education; ii) increased advocacy on the importance of well-trained teachers; iii) increased advocacy on fundamental curriculum and pedagogical change, shifting towards student-centered learning and teachers being facilitators of knowledge; and iv) holistic approaches to learning being implemented more.

3.1.4 Economic Trends

Major economic trends include increased connectivity of markets and work, an increase in privately managed public schools and a decrease in economic security.

Increased Connectivity

The interconnectedness of global trade has increased. Across manufacturing, financial and business services, global trade has increased between 1995 and 2015. The share of global exports from countries other than the OECD has increased considerably since 1995 (OECD, 2019, p. 23). The NPC echo's this trend (NPC, 2009, p. 31). According to the NPC, South Africa has benefited from globalisation, but at the same time is exposed to greater complexity and external risk, especially concerning its dependence on external capital for investment (NPC, 2009, p. 31).

Privately Managed Public Schools

Unwin et al. (2018) predict that the trend of governments contracting private corporations to deliver low-cost public schooling on their behalf will continue until 2020. India, Pakistan, Nigeria and East Africa are cited as example countries and regions.

Economic Security

Economic security, defined as a combination of financial and work security, is declining in OECD countries. Average household debt has increased after the financial crisis and

job security is declining due to globalisation, the gig economy and automation (OECD, 2019, p. 64).

3.1.5 Technological Trends

Technology is expected to become increasingly all-pervasive and thoroughly integrated into human life (OECD, 2019, p. 3; Unwin et al., 2018, p. 5). It is expected to continue changing the way goods and services are produced and traded (NPC, 2009, p. 33), and that the benefits delivered by technology will be increasingly unevenly distributed (Unwin et al., 2018, p. 5).

Further trends linked to technology include changes in internet access, devices, data and cybersecurity and risk.

Internet Access

Access to broadband services and the internet is expected to expand while the cost of internet access should decline. Unwin et al. (2018, p. 6) predict 90% of the world's population to have potential access to mobile broadband by 2025. In South Africa, internet access has expanded from 10% in 2009 to 56% in 2017 (The World Bank, 2019). Unwin et al. (2018, p. 6) expect a declining cost in connectivity, especially in the poorest countries. The high domestic cost of internet connectivity in South Africa is a major hindrance to expanding internet access (NPC, 2009, p. 33).

Devices

The cost of devices is expected to decline, while the performance of devices will continue to diverge. Unwin et al. (2018, p. 6) foresee tablets and smartphones becoming much more widespread with 75% of the world's population being able to afford these devices by 2025. However, the performance of top-end devices compared to low-cost devices will differ vastly with the poor only being able to access much lower performance technologies (Unwin et al., 2018, p. 6).

The move away from physical information storing and sharing (CDs and DVDs) towards streaming services is expected to continue. The amount of video content created and

shared is expected to multiply, placing greater strain on the capacity of digital infrastructure (Unwin et al., 2018, p. 6).

Data

The production and use of data are rapidly expanding. More sensitive and confidential data is being stored on servers across the world (OECD, 2019, p. 10) and “the production and use of large amounts of data will dramatically expand, especially with the advent of the IoT (Internet of Things)” (Unwin et al., 2018, p. 6). Unwin et al. (2018, p. 6) predict an increase in the selling of data, especially by governments or internet service providers to corporations, who can use the data for commercial gain. Linked to the boost in available data, is the proliferation in personalisation, as companies use data to tailor marketing and other content.

Who controls data will play an increasingly important role. Unwin et al (2018, p. 6) foresee the global corporations playing a progressively controlling role in technology and data handling. These companies are headquartered in the USA (Facebook and Alphabet) or China (JD.com, Tencent and Alibaba), with a possible power shift occurring towards China by 2025.

Cyber Security & Risks

Security breaches and risks linked to the internet and data are expected to increase. As data becomes more valuable and sensitive, the scale of data breaches has compounded. Between 2015 and 2018, the number of records stolen increased from less than 0.5 billion to over 3.5 billion. Additionally, as more infrastructure and industry is connected and controlled by the internet, governments and corporations are becoming more vulnerable to cyber-attacks (OECD, 2019, p. 58). Further risks include more “trolling, digital harassment, and the use of the Internet for unpleasant and illegal activities, particularly child pornography” (Unwin et al., 2018, p. 6).

Data misuse can threaten national security and sovereignty. For instance, the German federal state of Hessen has strongly advised against the use of Microsoft Office 365 in schools due to data security concerns (Oates, 2019). Last year, a whistleblower stated

that information collected on social media was misused to influence both the American and Brexit elections (Scott, 2018).

In South Africa, Padayachee and Kritzinger (2010) have stated that each child should learn about the risks related to ICTs and should be taught appropriate skills to mitigate and manage these risks through the Life Orientation curriculum.

3.2 What Makes This Study Unique

This study is unique as it provides an overview of how future trends may impact the basic education sector, specifically in a developing country. Unwin et al. (2018) provide an overview of expected technological and educational trends across developing countries that excludes broader political, social, environmental and economic trends. No studies that covered this wide range of trends in a developing country context were found in the literature review. The study also uses a novel mixed-method approach that will be discussed in section four.

4 Methodology

Several methodologies are traditionally used in foresight studies. Some examples include the Delphi method, trends analysis, scenario analysis and systems dynamics. Most foresight studies relating to education have applied an iterative approach. Multi-disciplinary teams complete systematic literature reviews, workshops and expert interviews in predefined steps, with studies taking up to two years for completion. In some cases, the methodology is applied to develop scenarios (Facer and Sandford, 2010) and in others to develop trends (Unwin et al., 2018).

Systems dynamics is an alternative approach that has not been extensively used in education. A system dynamics approach includes developing mathematical or conceptual models to evaluate policies or predict future outcomes. Some authors have developed agent-based models (Mital et al., 2014; Wang, 2017), some have created a combination of causal loop diagrams and stock and flow systems models (Johnson et al., 2018; Sanchez et al., 2009), and others have used conceptual systems models such as causal loop diagrams or actor diagrams (Assidmi, 2015; Grobbelaar and Buys, 2005; Groff, 2013; Ryan, 2016).

The nature and timelines of the master's dissertation and the novelty of systems dynamics were important considerations when developing the methodology. The time constraints and individual nature of the dissertation prohibited both a multidisciplinary-team iterative study and developing a mathematical systems dynamics model. The field of systems dynamics has rarely been applied to education, particularly in South Africa. The paper by Grobbelaar and Buys (2005) is the only exception discovered. However, this study is focused on higher education and its relationship to innovation. Thus, applying systems dynamics to principles to basic education provided a novel approach. Additionally, expert interviews are useful in completing foresight studies, as they are exploratory and allow flexibility based on participants expertise. Therefore, a sequential mixed-methods research approach was developed that relied on systems-research methods (Sterman, 2000) and social science research methods. While the term mixed-methods research usually means the mixing of qualitative and quantitative research methods (Creswell and

Clark, 2011) a mixing of a wider range of research methods has been proposed as an extended conception of the mixed-methods approach (Haßler, 2019). It is in this latter sense that the research here is mixed-methods research. An overview of the approach is presented in Figure 2.

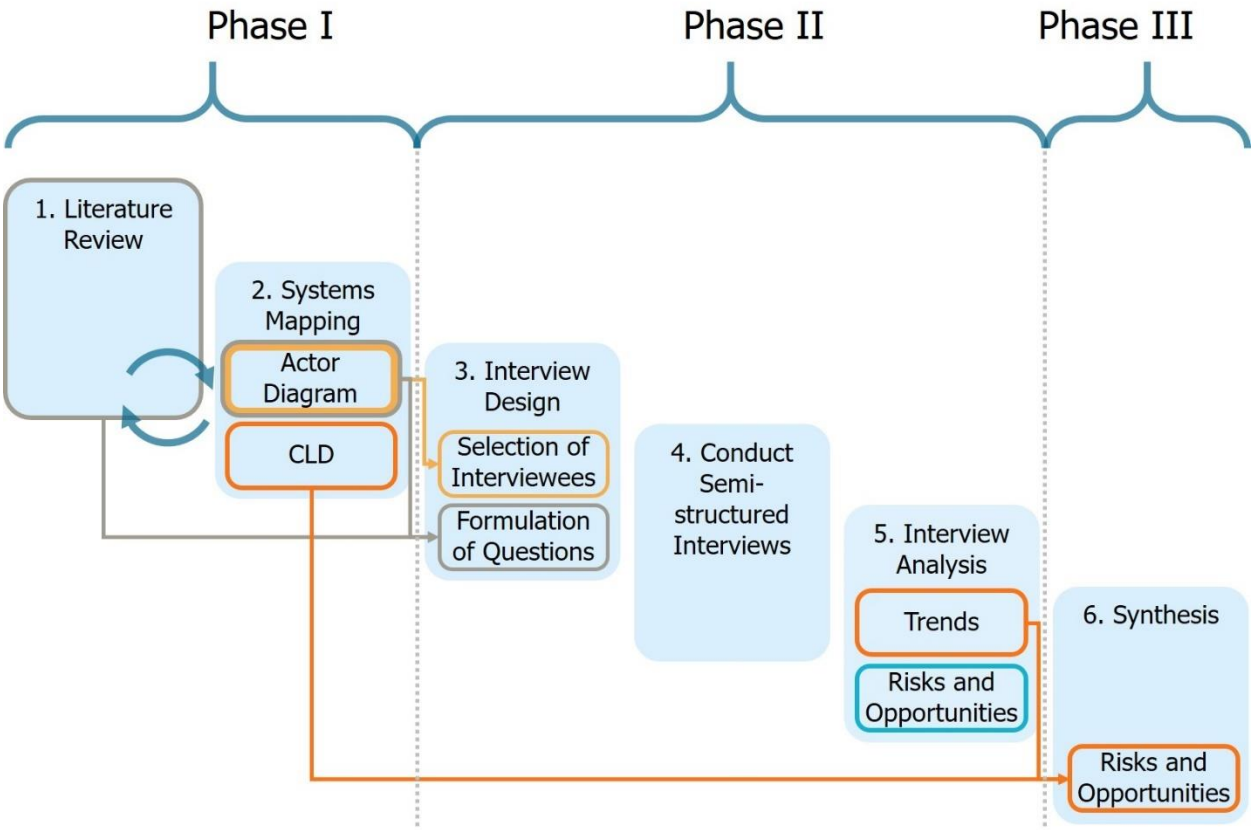

Figure 2: Overview of Methodology

4.1 Phase I: Systems Overview

The purpose of phase I was to identify trends impacting education globally and to understand the current state of the system.

4.1.1 Literature Review

A literature review was conducted first (c.f. Section 3). To map the South African Education system, further sources were read and include:

i) Academic literature (de Clercq, 2013; Gustafsson, 2019; Hindle, 2007; Hofmeyr et al., 2017; Mestry, 2006; Motala and Carel, 2019; Shalem and De

Clercq, 2019; Spaull, 2019, 2015; Taylor, 2019; Van Der Berg et al., 2017; Venkat and Spaull, 2015; Wills, 2016, 2015; Zengele, 2013);

ii) Legal and policy documents (South African Government, 1996b, 1996b); and

iii) Government publications (Fanoe and Kenyon, 2015; Ministerial Review Committee, 2003; *South African Yearbook: Education*, 2018; Volmink et al., 2016).

4.1.2 Systems Mapping

Conceptual systems dynamics models were developed to understand the current state of the system, following the iterative process proposed by Sterman (2000). This process includes five steps, namely: i) problem articulation; ii) formulation of dynamic hypothesis; iii) formulation of the simulation model; iv) testing and v) policy formulation and evaluation. As mathematical simulation models were outside the scope of this research, steps iii) and vi) were excluded from the methodology.

An iterative modelling approach was followed. Based on the findings of the above sources (c.f. Section 4.1.1), relationships between key variables were captured. Once sufficient relationships had been identified, the first drafts of the models were developed. These models were iteratively updated when new information arose.

A Causal Loop Diagram and an actor diagram were chosen to map the current state of the system. Sterman (2000) places a large emphasis on the purpose of the model in problem articulation (Sterman, 2000, pp. 89–90). For this research the purpose of systems modelling was i) to understand the underlying relationships that maintain the current system equilibrium; and ii) to map the most important actors in the systems and their relationship with one another. A Causal Loop Diagram and an actor diagram were most appropriate to fulfil these requirements and are explained below.

Causal Loop Diagram

Causal Loop Diagrams ("CLD") are used to model dynamic systems. An education system is a complex dynamic system (Groff, 2013; Mital et al., 2014). Therefore, synthesising the South African education system into a CLD was appropriate.

CLDs portray nodes, different variables within the system, and their relationship to one another. Parallel perpendicular lines on arrows indicate delays between variables. Plus signs mean that the relative direction of change over time of two variables will be the same, while minus signs portray an inverse relationship of the direction of change: the increase of a variable corresponds to a decrease of another and vice versa.

For example, the relationship between family income and school fees is positive. As family income increases, the amount of school fees paid for a child's education rises. Conversely, as family income decreases, the ability to pay school fees diminishes.

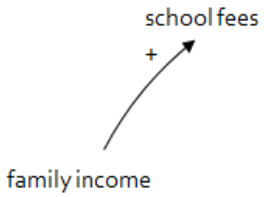

Figure 3: CLD Explanation

The power of using CLD's is their ability to highlight the complex, non-intuitive behaviour of a system, by uncovering underlying feedback loops. Feedback loops are closed chains of causal relationships between nodes. Positive, or reinforcing feedback loops lead to exponential growth or collapse over time. Negative, or balancing feedback loops are goal-seeking, tending towards an equilibrium over time.

Actor Diagram

"An actor diagram is a visual depiction of key organisations (...) that make up a system, including those directly affected by the system as well as those whose actions influence the system" (Gopal and Clarke, 2015). It can be used to explore the relationship and connection between actors.

The connections between actors were classified according to three of Gharajedaghi (2011) systems dimensions: wealth, power and truth. These dimensions succinctly capture the most important relationships between actors, while highlighting that difference in relationships depending on the systems lens.

4.2 Phase II: Expert Interviews

The purpose of phase II was to identify possible future trends, risks and opportunities. Semi-structured expert interviews were chosen to fulfil this purpose, based on the guidance of Rowley (2012): this phase of the research centered on understanding the experiences and opinions of participants and required both flexibility and structure. Flexibility was required to adapt the questions based on participants answers and expertise, while the overall structure assisted in collecting data that could be integrated and collated.

Outcomes of phase I informed the design of the semi-structured interviews. The actor diagram was used to identify the types of participants to be included in the study. A broader literature review focusing on global trends and the guidance of Rowley (2012) were used to develop the interview guide (see Appendix B).

Based on the actor diagram, possible interviewees included representatives from the state, trade unions, professional associations, school governing bodies, academia, and civil society organisations. The primary focus was on leaders within organisations or experts in specific fields. Once individuals and organisations had been identified, contact details were sourced from the internet. Possible participants were invited to partake via email or phone call. Ultimately the interviewees represented a diverse set of organisations, perspectives and experiences (see Appendix A).

Interviews took place telephonically and the conversations were recorded using a dictaphone. Written consent was obtained from all participants ahead of the interviews. Recorded interviews were transcribed and then analysed.

Thematic coding was used to analyse the interviews. A combination of inductive and deductive coding was used to identify and classify trends, risks and opportunities (Hsieh and Shannon, 2005). In the first step, emergent themes were identified using inductive coding, whereby themes were defined based on the data. Examples include low-cost schools, the fourth industrial revolution and privatisation. In the next step, the various codes were classified into pre-existing categories, namely economic, environmental, political, social and technical themes. These categories follow the PEST analysis,

originally introduced by (Aguilar, 1967) with the addition of the environmental category. An iterative approach was followed to group and cluster codes and themes using a tree diagram. Examples of coding and grouping are included in Appendix C.

4.3 Phase III: Synthesis

In the last phase, the results of phase one and two were synthesised. The likelihood of a trend increasing or decreasing inequality was assessed by evaluating the possible impact the trend may have on the CLD. An opportunity was defined as a trend that had a high likelihood of decreasing inequality in learning outcomes and the opposite was defined as a risk.

5 Results

The results are presented in this section. The two complementary conceptual models depicting the current state of the system are presented first. This is followed by the trends that were identified and their associated opportunities and risks. The section is concluded by a discussion on role-players.

5.1 The Current State

A Causal Loop Diagram (CLDs) and Actor Diagram are presented below.

5.1.2 CLD of the South African Education System

The literature read was synthesised into the CLD depicted below in Figure 4. Income-, teacher-, governance- and capacity inequality and their relationship to learning outcomes are important elements of the CLD.

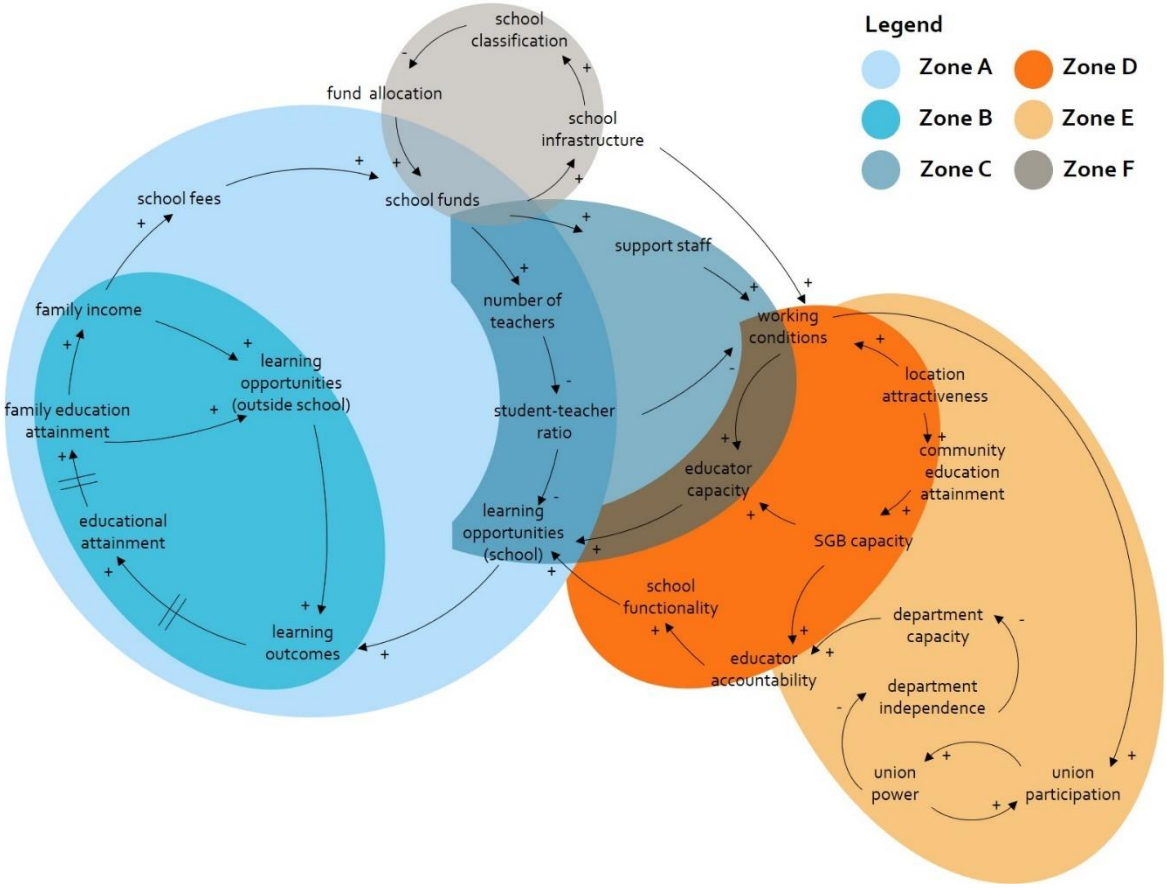

Figure 4: CLD of South African Education System

Income inequality results in divergent learning outcomes as demonstrated in the reinforcing feedback loop (Zone A). As family income and school fees increase, available school funds rise, enabling the school to employ additional teachers. As the teacher numbers grow, the student-teacher ratio decreases[4], resulting in more learning opportunities for a child, better learning outcomes, and ultimately, higher educational attainment[5]. Increased educational attainment results in better employment prospects and higher income. Through time, these benefits are passed down from one generation to the next. Conversely, if the starting point of family income is low, following the same relationships, educational attainment is ultimately lower.

Income inequality also results in unequal learning opportunities outside of the classroom (Zone B). Children from wealthier homes can pay for extra-curricular activities or have access to family members that can assist them with homework. This increases their opportunities to learn outside of the classroom and ultimately lead to better educational outcomes.

Additionally, wealthier schools attract more qualified teachers (Zone C). Wealthier schools have better infrastructure, are often located in nicer areas[6] and have resourced to employ additional support staff teachers. The combination of more support, lower student-teacher ratios, better infrastructure and nicer location improves overall working conditions, attracting more highly qualified teachers[7].

The disparity in SGB capacity further perpetuates inequality. Highly skilled SGB ensure that the best teachers are hired and govern school effectively, increasing the accountability of principals and teachers, while under-skilled SGBs are often dysfunctional. The capacity of the SGB is tightly coupled to the overall educational

[4] The relationships between school fees, teachers and student-teacher ratios were extracted from Motala and Carel's (2019) results.

[5] Educational attainment is defined as the highest level of educational certification obtained.

[6] Nicer areas are described by the variable "location attractiveness", which is defined in terms of a school's location, and ranked by rural (1), urban (2) to suburban (3) and includes safety of surrounding area, travel time for educators and community support as additional factors.

[7] The relationships between support staff, working conditions and educator capacity were extracted from Motala and Carel's (2019) results.

attainment of the school and surrounding community, which links back to location attractiveness (Zone D).

Discrepancies in educator accountability also result from differences in teacher union influence. Teachers with poor working conditions are more likely to actively participate in unions. As teacher participation rises, the influence and power of the union increases. With more power, the likelihood of undue union influence rises. Undue union influence can lead to inappropriate appointments or the removal of key policies, both decreasing educator accountability (see background sub-section 2.2.1). Conversely, teachers whose working conditions are good, participate less in unions, decreasing union power and undue union influence. This increases state independence and educator accountability.

Figure 5: Balancing and Reinforcing Feedback Loops

The government's policy on school infrastructure spending is pro-poor and the only element of the CLD not perpetuating inequality (Zone F). More funds are allocated to

poorer schools, as determined by the National Norms and Standards for School Funding (South African Government, 2006). While this policy is good, only 10-13% of provincial budgets is allocated to infrastructure development (UNICEF, 2018), demonstrating that at current standing the inequality of the system is set to worsen, if no successful interventions are implemented.

Combining these elements, eight reinforcing feedback loops arise (see R1 to R8 in Figure 5). These strengthen the divergence of learning outcomes based on family income and background. One balancing feedback loop arises based on the government infrastructure spending policy (see B1 in Figure 5).

The diagrams and underlying feedback loops discussed above demonstrate how the structure of the system and its underlying dynamics are maintaining a system equilibrium. In this equilibrium vastly different learning outcomes are achieved based on a child's background

5.1.3 Actor Diagram

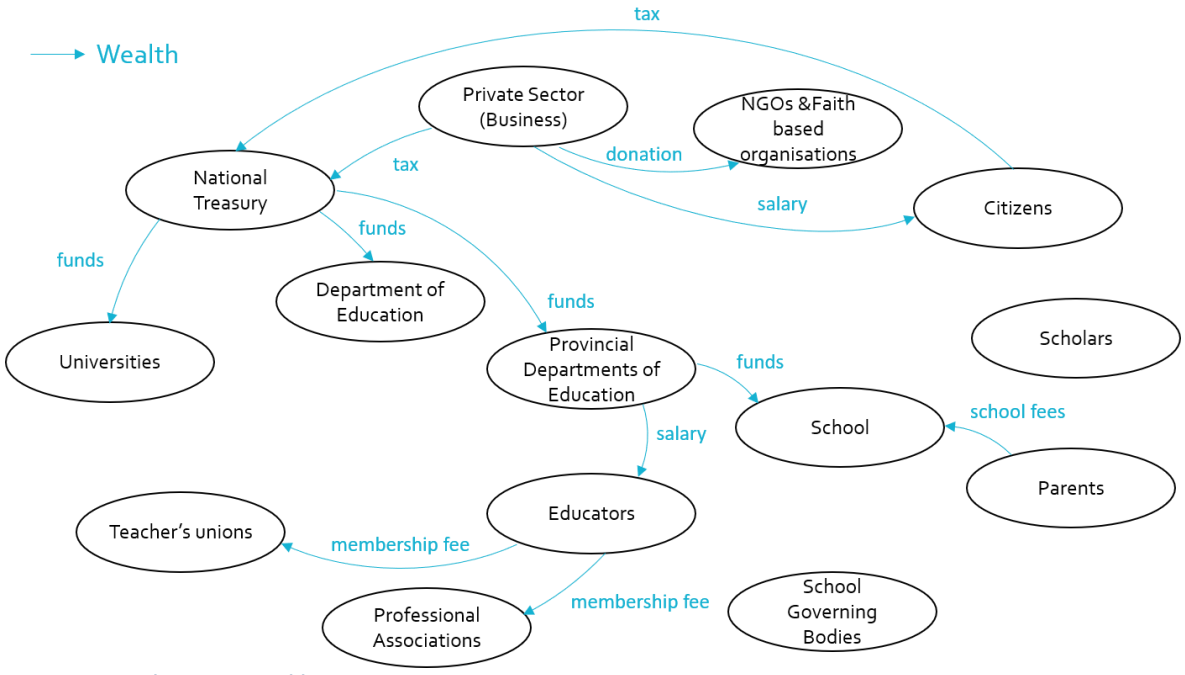

Figure 6: Actor Diagram: Wealth

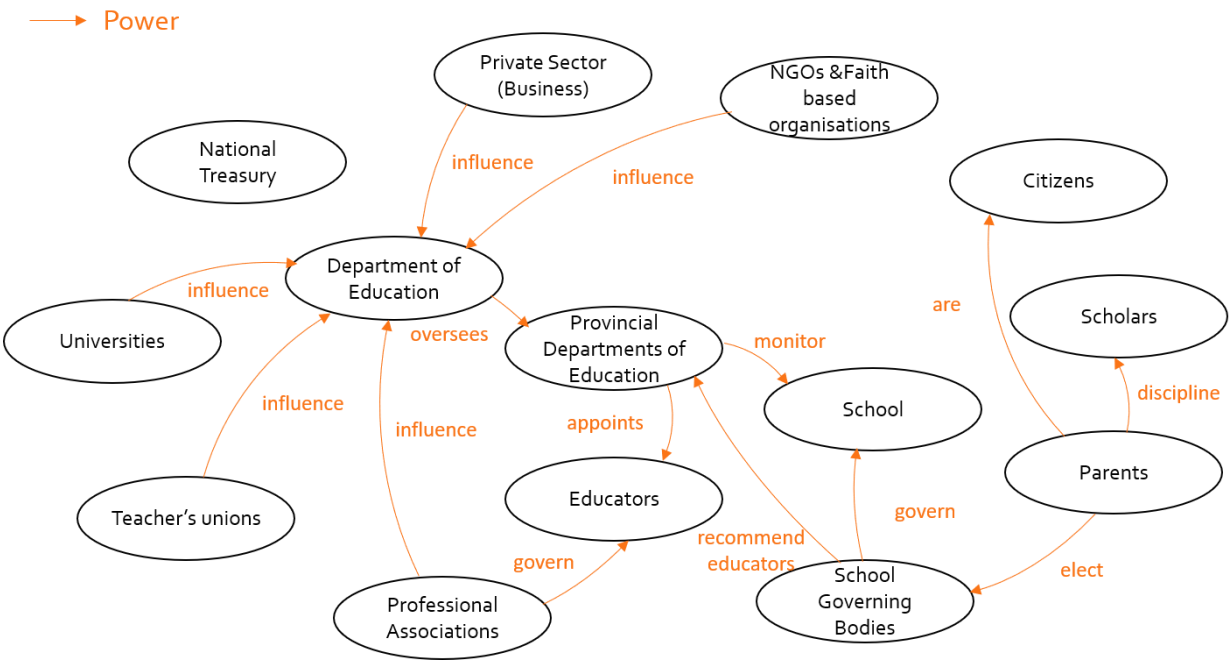

Figure 7: Actor Diagram: Power

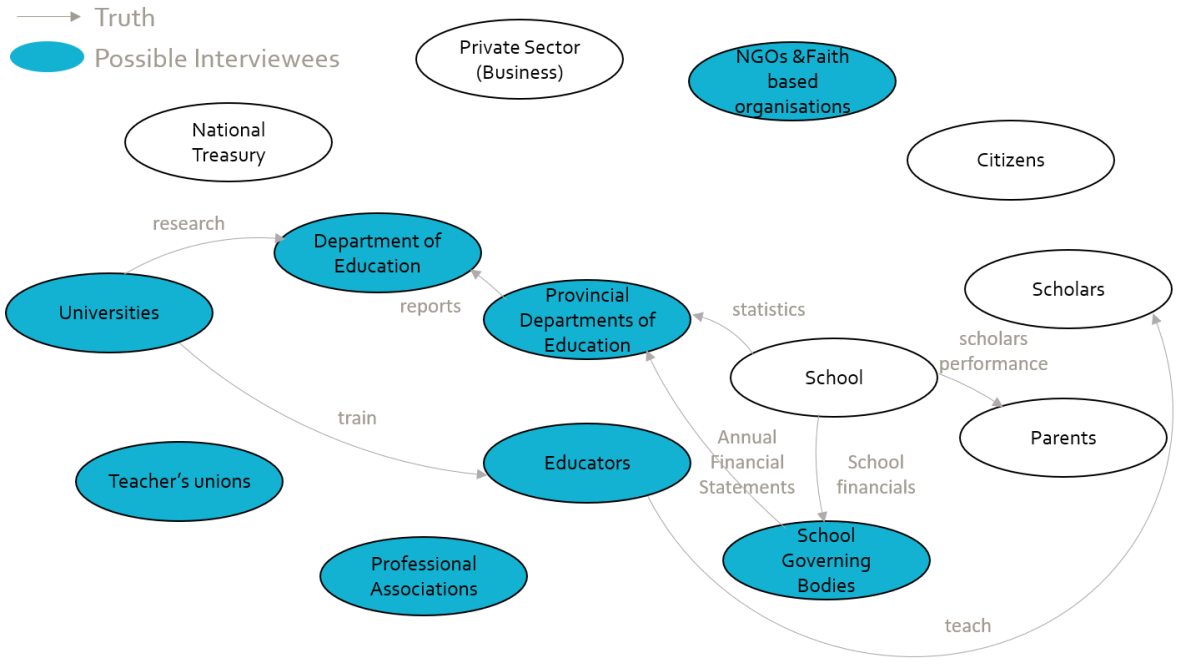

Figure 8: Actor Diagram: Truth

This Actor Diagram was used to identify organisations and individuals to interview for the next phase on the research.

5.2 Future Trends, Opportunities and Risks

The previous subsection presented the CLD and the Actor Diagram. The Actor Diagram informed the selection of participants for the semi-structured interviews. The results of the interviews are presented next.

The interview analysis resulted in the summary presented in Figure 9. If a trend was central to the interview with the participant, then a 'person icon' was added (Maximum 11 interviews).

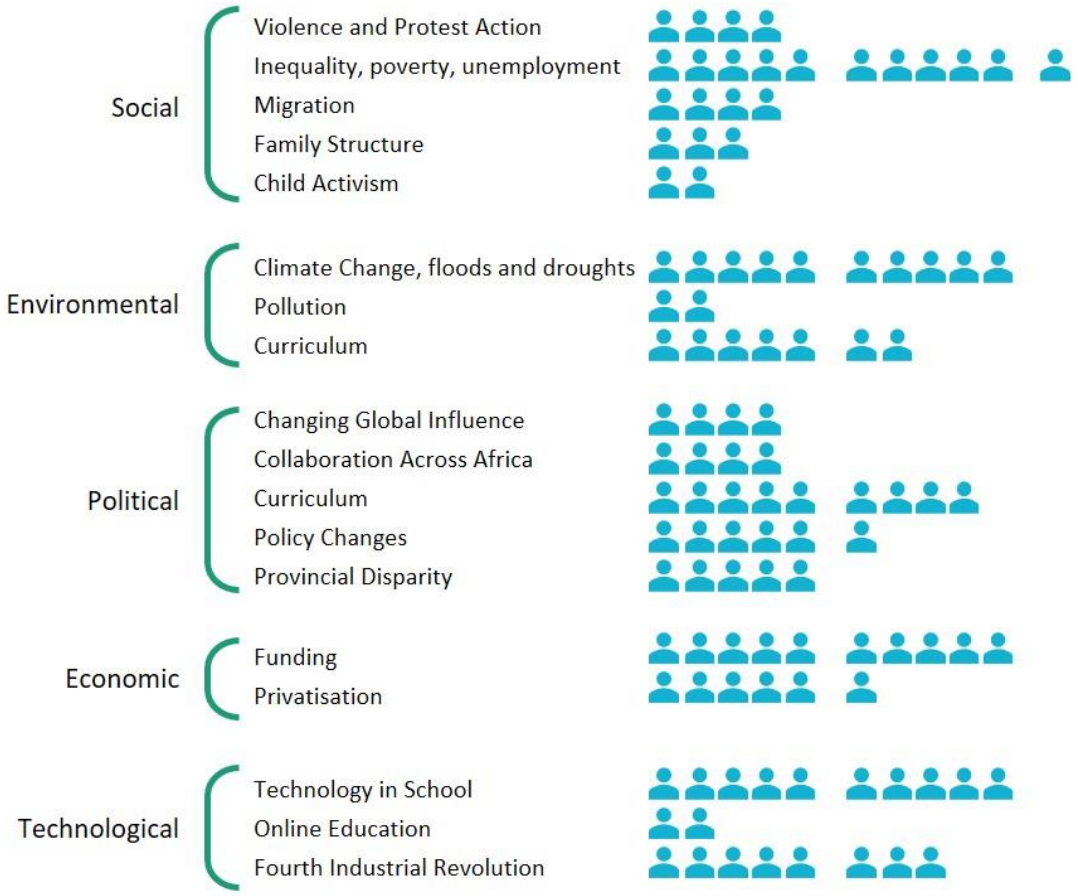

Figure 9: Trends Central to Interviews

The detailed findings are separated into social, environmental, political, economic and technological trends, based on the work of Aguilar (1967) (see section 4.2 for details). The opportunities and risks that correspond to each trend are included in boxes below and separated into (***P)*** opportunities and risks that were highlighted by **p**articipants and (***S)*** opportunities and risks that arose in phase III of this **s**tudy (see section 4.3). For (***P***),

a three-star rating scale is included based on the consensus and confidence of interviewees[8].

5.2.1 Social Trends

Social trends identified through the interviews include inequality, violence, protest action, family structure, migration and child activism.

Inequality, Poverty and Unemployment

A social characteristic mentioned by all participants is inequality. The closely linked challenges of poverty and unemployment were mentioned by five and six participants, respectively. These challenges were given a high priority by most participants. Two participants commented on the relationship between unemployment and technology: on the one hand, highlighting the risk that technology could increase unemployment; and on the other noting that this relationship is still poorly understood. None of the participants commented on the trajectory of inequality.

Risk (*S*) Deepening inequality could result in strengthening the inequality of learning outcomes.

Violence and Protest Action

Prevailing inequality and poor service delivery have led to regular service delivery protests and violence. Concerning developments related to protest action include the destruction of school infrastructure and family pressure for children to participate in protests, breaking down the culture of learning. Four participants discussed this trend.

Violence was mentioned by four participants. Three participants highlighting gang violence in Cape Town specifically. Drug-related violence, gang violence, child-on-child violence, murder, robberies and theft were cited as examples of violence affecting schools. All participants discussing this trend believe violence was increasing.

[8] One star: one interviewee. Two stars: two interviewees. Three stars: three or more interviewees, high confidence and consensus.

Risk (*P*) One participant highlighted the risk that increased violence could result in the teaching profession becoming unattractive to future candidates, or could lead to well qualified, experienced teachers leaving the profession.

Risk (*S*) The likelihood that this trend will disproportionately affect the poor is very high. It would thus deepen the inequality of learning outcomes.

Migration

Another social trend impacting education is migration. South African citizens are moving from rural to urban areas and from poorer to wealthier provinces. International migration is drawing in people from neighbouring countries, while some wealthy South Africans are moving abroad. Better economic opportunities, education and access to healthcare were reasons cited for migration by participants in this study, while war and climate change were cited as possible drivers that could increase migration. Migration was discussed by four participants, with one participant noting the possibility of an increase in migration.

Xenophobia is a concerning trend linked to migration. Three participants commented on this. The fear of losing income opportunities to foreigners was noted as a possible motivation for violence by a participant. Another participant mentioned that discrimination towards foreign learners in schools is taking place. The role that schools should play in creating social cohesion, especially concerning xenophobia, was highlighted by a third participant.

Risk (*P*) The likelihood of parents changing schools should their disposable income increase is very high. If possible, parents send their children to previously white schools, abandoning township schools. This internal migration concentrates resources in some schools, while others are left behind. This risk was highlighted by one participant.

Family Structure

Three participants noted changes in family structure. Many South African children, across income and ethnicity, are growing up in single mother-headed households. According to

one participant, this applied to more than half of the current child population between the ages of 3-17.

Risk (*S*) As family structures change, parents capacity to assist children in school activities could diminish. Additionally, a child's family responsibilities outside school could rise. These changes could lead to an increase in inequality of learning outcomes for children affected by this trend.

Child Activism

A fringe trend identified through the interviews was an increase in pupils participating in climate-related protest action. While this trend was not specifically highlighted by interviewees, two participants mentioned scholars participating in student protests related to climate change in recent months.

Risk (*S*) Children disengage from school to participate in climate-related protests, decreasing their opportunities to learn.

5.2.2 Environmental Trends

Floods, droughts and curriculum changes and pollution were mentioned about the environment. Overall, six participants agreed that the environment was not a priority for South Africa. Some participants argued that the environment does not surpass priorities such as inequality and unemployment, basic school infrastructure needs and quality education. Other participants highlighted political decisions, such as the commissioning of additional coal-fired power stations, that demonstrated limited political will and prioritisation on the topic. Notably, only two of the twelve participants discussed elements of climate justice, that climate change will disproportionately affect the poor.

Floods and Droughts

Floods and droughts were noted by several participants as changes in climate experienced in South Africa. Three participants referenced the drought in Cape Town and five participants mentioned the floods in KwaZulu Natal or cyclone Idai specifically. Interestingly, only two of the participants linked the floods and droughts to climate change.

The wider impact of floods and droughts on schools were discussed by three participants. Examples cited include: i) flooding damaging school infrastructure, roads and pathways, putting children's and teachers' lives at risk when travelling to school; and ii) water scarcity diminishing safe sanitation and food security.

Opportunity ✦ ***(P)*** The drought in Cape Town resulted in increased social cohesion and collaboration and could be an example of how climate disasters bring communities closer together, according to one participant.

Risk ***(S)*** Schools with additional resources can invest in climate mitigation infrastructure, while other schools rely on state resources. The likelihood of climate disasters disproportionately affecting poorer schools is very high and could lead to a greater divergence in learning outcomes.

Curriculum

Most participants related environmental trends to changes in the curriculum, noting that the curriculum could be changed to include aspects of sustainability or climate change. One participant argued that this was important and should be implemented, while three others believe that this may be a distraction from delivering more pressing basic needs.

Opportunity ★★ **(*P*)** Two participants believe that incorporating sustainability into the curriculum is an opportunity. One arguing that this could be a mechanism to engage children in the climate conversation earlier. The other stated that is important was to teach children to live within planetary bounds.

Pollution

Water and air pollution were highlighted by two interviewees. The impact of water pollution due to poor maintenance of the sewage system in a water-scarce country like South Africa was noted by one interviewee. Another shared how poorly managed waste and littering is polluting rivers such as the Dusy outside Pietermaritzburg.

Risk (*S*) Well-resourced communities can invest in infrastructure to combat pollution or have access to private health insurance should pollution affect their children's health. Pollution therefore disproportionately impacts low-resource communities and could increase the inequality of learning outcomes.

5.2.3 Political Trends

Recent policy and curriculum changes, provincial differences, changes in global influence and increased collaboration across Africa were identified as political trends.

Policy Changes

The introduction of a vocational stream and the restructuring of Early Child Development (ECD) are two major policy changes. Two participants celebrated the introduction of the vocational stream that is currently being piloted and two others highlighted the need for more vocational training.

Participants expressed differing views on the restructuring of ECD. One participant recounted the strong evidence base supporting a focus on ECD and its long-term benefits. According to another, the gaps in ECD were due to a lack of political will. Another participant supported the migration of ECD from the Department of Social Services to the DBE while another strongly argued against this development.

Risk ✦✦ ***(P)*** Two participants highlighted the risk that poor implementation of policies could result in worse learning outcomes.

Curriculum

Language, technology, gender, decolonisation and sustainability were different elements voiced about the curriculum.

Various aspects of language were mentioned by six participants. Participants expect changes in the language policy but view this as highly unpredictable. One participant mentioned the introduction of a third conversational language, while two others mentioned that some children are learning Mandarin. One interviewee highlighted the tension between the Gauteng Department of Education and Afrikaans schools due to language policies. Another provided a nuanced view of language: on the one hand, learning in mother tongue for longer can improve basic literacy, on the other, non-fluency in English can lead to economic exclusion.

Coding, robotics and information technology is being introduced as a new subject in primary schools. Four participants discussed this development. One strongly advocated for each child to learn how to code. Conversely, two challenged this development: “the problem is that if you can’t read you can’t code” and “kids can’t read, but try let’s teach them to code”.

Curriculum changes around gender and decolonisation were discussed. On gender, one participant said that the inclusion of sex-positive content and gender identity in the Life Orientation curriculum were being discussed with the DBE. This had not been received positively by the DBE and may remain unchanged. Very differently, the DBE has proactively engaged in topics around the decolonisation of the curriculum. This was highlighted by two participants.

For changes related to sustainability, please see *Curriculum* in section 5.2.2.

Risk ✦ **(*P*)** One participant highlighted the risk that changes in curriculum, following a skills-based model, could diminish improvements in learning outcomes. This interviewee citing the example of Outcomes Based Education and its negative ramifications in South Africa.

Provincial Disparity

Provinces are interpreting policy differently, leading to an increase in provincial disparity. One participant expects increasing fragmentation in terms of provincial responses to educational challenges, while four others provided examples of provincial differences: i) WiFi is being rolled out in the Western Cape and Gauteng for all schools, while other provinces lag; ii) families are migrating to wealthier provinces for better learning opportunities; iii) Gauteng is focusing on e-learning; and iv) the Western Cape is piloting academy schools.

Risk (*S*) This trend could result in further differences in learning outcomes based on a child’s place of birth.

Changing Global Influence

The rising global influence of China on South Africa was noted. As China's ideological power increases, its culture and language may be adopted in South Africa. The introduction of mandarin in some schools is an example of this influence. The trade war between the United State of America and China could impact import and export destinations as well as broader international relations. These different elements were mentioned by four participants.

Risk ✦ ***(P)*** A second financial crisis or global recession would have a strong negative impact on South Africa. This could lead to counter traditional views having more political sway, for example, the reserve bank losing its independence, according to one participant.

Increased collaboration Across Africa

Four participants discussed a possible increase in collaboration and partnership across the Sub-Saharan African region. Elements of increased cultural and social integration, curriculum alignment and cross-border investments were mentioned on this topic.

Opportunity ✦ ***(P)*** There is an opportunity for Africa to become a leader in research and development through increased collaboration, according to one participant.

5.2.4 Economic Trends

The economic trends highlighted by participants included funding and privatisation of education.

Funding

Many participants raised concerns about funding. Six participants voiced concerns around a contracting South African economy that would decrease the governments' overall budget and could lead to budget cuts in social spending. The government-guaranteed debt of State Owned Entities ("SOE") was raised as another concern by two participants, as a government bail-out could also result in less available resources for social spending. Six participants raised concerns around sufficient funding and budget allocation towards basic education.

Risk ✶✶✶ **(*P*)** Risk of funding in education decreasing.

Risk (*S*) Too little funding will disproportionately affect poor communities, as these do not receive books, stationary or infrastructure upgrades, increasing the inequality of learning outcomes.

Privatisation

The trend of privatisation was linked to the growth in low-fee private school and the introduction of privately managed public schools. Six interviewees noted the growth in low-cost private schools. While one mentioned that the saturation point for these types of schools would soon be reached, and the growth thus stifled, three others believe this growth will continue.

Two participants discussed the introduction of privately managed public schools in the Western Cape. While one believed that this was a marginal trend that would not have a large effect on the entire system, another noted the risks of redirecting resources away from other public schools to fund these institutions.

Risk ✶✶ **(*P*)** Concentrating resources in the private sector and the best

teachers exiting the public sector for better pay in the public sector are two risks mentioned by participants.

Risk (S) This trend could increase divergence in learning outcomes.

5.2.5 Technological Trends

Major technological trends include technology in school, online education and the fourth industrial revolution.

Technology in Schools

Technology was discussed by all participants through various lenses. Physical technological infrastructure, in terms of internet access and devices, as well as software were mentioned. Different applications of technology were also highlighted.

There is a general trend towards more internet access, and this element was mentioned by six participants. The Western Cape and Gauteng's PDEs are taking the lead in ensuring all schools have access to WiFi, according to one participant. Two participants highlighted the importance of teachers in conjunction with internet access: the first noted the importance of teacher training; the second the critical role teachers must play in selecting and directing pupils to appropriate information.

Different types of devices were mentioned and there is no consensus on who should be funding them. Tablets, laptops, smartphones and smartboards were mentioned as types of devices, with none of the participants providing any preference. Seven participants mentioned that the state is providing devices and or technological infrastructure to schools. Two participants specifically mentioned the President's SONA address in February, in which he promoted a one device per child policy. One participant strongly advocated against this, stating that the focus should be on the use of own devices for first teachers and later pupils.

Software was only mentioned by three participants. Two highlighted the importance of software selection in providing integrated technological solutions, while the third provided an example of how Google Classroom is being used as a tool to communicate with parents and provide information to pupils.

Three applications of technology in school were discussed: i) technology as a teaching aid; ii) technology for teacher support and training; and iii) technology for management and governance. Nine interviewees discussed technology in terms of how it could impact

the learning and teaching process, either as a teaching and information aid or as a direct to student support. Alternative uses were voiced much less: one interviewee noted the use of technology for teacher training and development; two interviewees mentioned that technology could be leveraged for enhanced governance and management.

Opportunities ★★★ ***(P)*** Many participants viewed technology as an opportunity that could deliver improvements in learning outcomes.

Risk ★★ ***(P)*** Participants noted the following risk linked to technology: that it does not result in improved learning outcomes; that it increases the digital divide; that teachers and learners do not know how to use technology and fall behind; and that it can result in surveillance and lack of data protection for children and vulnerable populations.

Online Education

An increase in online education and Massive Open Online Courses ("MOOC") is expected by two participants. The first viewed this as a possible major disrupter. The second noted that while this was an opportunity, the risk of the best resources only being available behind paywalls could limit its potential.

Fourth Industrial Revolution

The advent of the fourth industrial revolution ("4IR") was mentioned in ten of the eleven interviews. 21st century learning, 21st century skills, technology in school, artificial intelligence, machine learning, robotics and digitisation were mentioned in conjunction with 4IR. Artificial Intelligence, machine learning, robotics and digitisation are types of technologies associated with the 4IR, while 21st century skills and 21st century learning are changes in the education system that are foreseen, based on technological advancements. None of the participants explicitly made this differentiation.

The future of work linked to technological changes was discussed by six participants. One participant provided a summary: with the advancement of technologies such as machine learning, artificial intelligence and robotics, the competition in the job market is not only

between humans but also between humans and machines. The type of work that machines and humans can master is however quite different. Machines are well placed in highly-repetitive, routine tasks, while humans have skills such as empathy, inter-relational skills and creative problem solving that machines do not. This impacts the education system, as schools should teach those skills in which machines can not compete (21st century skills).

The interviewees had differing views on the importance of these developments. Four believed staying abreast with these developments was imperative to ensure the country remains competitive. Another feared that the focus on skills-based training could lead to curriculum changes that would diminish overall learning outcomes. The difficult balance between improving basic literacy skills and technology-related skills was highlighted by one participant, while the current unequal distribution of technological resources was voiced by another.

Risk ★★★ **(P)** Improvements in technology could increase unemployment, according to participants. If the country is too slow to adapt, it could lose international relevance, a risk highlighted by three participants.

5.3 Key Actors

In the previous subsection, details of the identified trends were provided. Findings of the expert interviews on key actors are presented next and provide an insight into interviewees' opinions of various stakeholders' roles, responsibilities and relationships.

Commentary around the need for more collaboration and leadership capacity applied to all stakeholders. Three interviewees believe that the lack of collaboration is one of the reasons the education system has not changed into a desirable state. Four others viewed enhanced collaboration between the state, private sector, civil society and the unions as a major opportunity. Limited capacity and leadership ability were mentioned by four of the interviewees, who provided this as another reason for limited change in the sector.

5.3.1 DBE

The DBE's importance, role, failures and relationships with other stakeholders were discussed by interviewees. Seven interviewees highlighted that the DBE is the most important actor. For example, the technology agenda seems to be driven by the state, not from academia, civil society or the private sector, according to one participant.

Various roles of the DBE were cited: policy crafting; setting of the curriculum; monitoring policy implementation; protecting the right to education enshrined in the constitution; hosting conferences; and responding to trends (e.g. violence).

Three critiques of the DBE were expressed. The quality of bureaucrats in the DBE was questioned, capacity constraints were highlighted and questions were raised around the DBE's effective use of resources.

The DBE's relationships with provinces, unions, NGOs and the private sector were discussed. Two participants believe that the relationship between the DBE and PDEs will become increasingly fractious, as policy and roles are interpreted differently. Four participants commented on the relationship between the DBE and the unions, especially referencing the tripartite alliance and SADTU. The shared view that this is an important relationship to monitor in the future was expressed by all participants. Reasons cited include: i) appointments of union members into the DBE; ii) mutual accountability between

the DBE and teachers; and iii) policy influence of SADTU. Two participants expressed hope for better collaboration between the DBE and NGOs and increased inclusion of NGOs with contrary opinions in DBE civil society engagements. One participant supported the notion of increased collaboration between the DBE and private sector but strongly advocated for the DBE to ensure coherent governance and oversight of private sector actors engaging in education.

5.3.2 Teachers

The importance of teachers, their capacity, training and support, as well as risks related to teachers were highlighted. Three interviewees noted that teachers are critical in education and two believe that teachers are not at risk of being replaced with technology. Teacher's capacity and training were discussed by seven interviewees. Skills gaps and training needs were highlighted, include: i) the vocational stream; ii) using restorative development approaches as opposed to corporal punishment; and iii) the knowledge gap due to the apartheid regime. Three participants highlighted that large-scale upskilling and reskilling of teachers could have a massive impact on the education system.

Three risks related to teachers were mentioned. One participant highlighted the risk of private schools drawing well-qualified teachers and principals out of the public schooling system. Another discussed the risk of losing and not attracting the best candidates due to violence in schools. A third noted the risk of too few teachers being appointed within the system, should funding decrease. A funding decrease could also decrease the availability of basic resources such as books, libraries and infrastructure, making teachers feel less supported, decreasing the quality of education.

5.3.3 Teachers Unions

The changing role of teachers' unions, the relationship with the DBE and the barriers the unions can set were noted in the interviews. The traditional role of the unions has been to protect the conditions of work for teachers, as mentioned by four participants. This role has changed and now includes teacher development and training, shaping the rules of professional conduct and professionalisation and in some cases management and governance of schools. Interviewees viewed these developments very differently. One

participant believes that the union's role should be confined to its traditional role. A second criticised the union's involvement in management and governance. A third believed that the unions are a critical driving force of change, and two others believed the union's involvement in professionalisation and teacher training were positive developments.

Three participants noted changes in the relationship between the DBE and the unions. Where the relationship was once adversarial it has become more cooperative. Furthermore, where underperforming teachers were once fully protected by the union, more teachers are being held to account for their actions. However, four participants viewed the unions as a barrier to change within the system.

5.3.4 Professional Associations

The role of educator professional associations was discussed by three participants. Educator professional associations include SACE, principal associations and teacher subject association. The role of a professional association, according to a participant, is to bring teachers together to discuss the curriculum, enhance teaching capacity and foster pride in the profession. One participant argued that teachers should be organised into professional associations rather than unions, while another argued that teachers should not be seen as an essential service and should retain their right to strike as union members.

5.3.4 SGB and Parents

SGB model, future role, capacity differences and challenges were mentioned. The SGB model was discussed by three participants: two believed that the model is good, and two mentioned that the state was uncomfortable with the breadth of SGB power. Beyond governing schools, one participant believes SGB's should create value-driven communities to foster safe environments for learning. According to two participants, SGB's could play a role in opposing changes to the law through the judicial system. The disparity in SGB capacity and effectiveness was discussed by seven participants. Overall, participants agreed that SGB were effective in some settings while failing in other settings. Five interviewees commented on the need for more and better training of SGBs, with one noting the lack of collaboration and information sharing between different SGBs. Two

participants noted the corruption on SGB level, especially relating to the selling of teaching posts.

The roles of parents were mentioned and include: paying schools fees; selecting schools; holding schools and educators accountable; governing schools; and acting as examples for their children.

5.3.4 Private Sector

The private sector plays two important roles in education; it provides training and it provides additional funding in education through corporate social investment ("CSI"). Both of these elements were noted by three participants. One participant argued that the private sector role should include influencing policy and bringing rigour into public sector management through partnerships with the government. Another noted the precarious balance of CSI funds either being used to meet basic needs or for systemic change, noting that more focus on the latter may be needed.

5.3.5 NGO and Faith-based Organisations

The number, role, failures and opportunities of the NGO sector were discussed. Three participants noted that many NGOs are working in the South African education sector: over 2000 NGOs, according to one participant. Equal Education and Section 27 are important NGOs that were mentioned by four and three participants, respectively. Influencing policy, providing additional capacity, testing innovative solutions and sharing best practice were roles associated with NGOs in this study. According to one participant NGOs have played an especially important role in mobilising resources towards ECD. Three participants expressed critiques of NGOs: NGOs may not be working on systemic changes, are creating dependencies in communities and are indirectly sponsoring privatisation in some instances.

The historic, current and future role of faith-based organisations was discussed. One participant noted that churches played an important historic role in developing education in South Africa. A second mentioned that faith-based organisations supplement education through their teachings on values and morality. According to a third, in the future, these

organisations could mobilise change and play a bigger role in improving the education system.

5.3.6 Universities

Summarising the comments of four participants in this study the role of universities in basic education is twofold: they train teachers and they produce research to shape policy and influence decision making. According to one participant, teacher training is not a priority in South African Universities. Another believes universities have a critical role to play in aligning teacher training to 21st century skills.

Participants commented on the media and the judiciary as additional actors, that had not been considered in the actor diagram or the interview questions.

5.3.7 Media

Four interviewees mentioned the media, especially noting the critical role the media plays in shaping public opinion. The coverage of violence in schools was mentioned as a specific example by a participant who argued that it should be excluded from media coverage to not dissuade candidates from becoming teachers.

5.3.8 Judiciary

Two participants noted the role the judiciary could play in the future, should further issues or policy and legislative gaps be brought before the courts by SGBs and NGOs.

6 Discussion

The discussion is divided into two subsections. First the trends impacting South Africa, as identified in this study, are compared with international trends identified in the literature review. A discussion on the key trends of violence, climate change and technology supplements the comparison. Secondly, some comments will be made on key actors and the findings from the expert interviews.

6.1 Comparison of South African and Global Trends

The vast majority of the trends impacting South Africa align with broader global trends. An overview of the trends identified in the literature review compared to the trends identified in this study is presented in Figure 10.

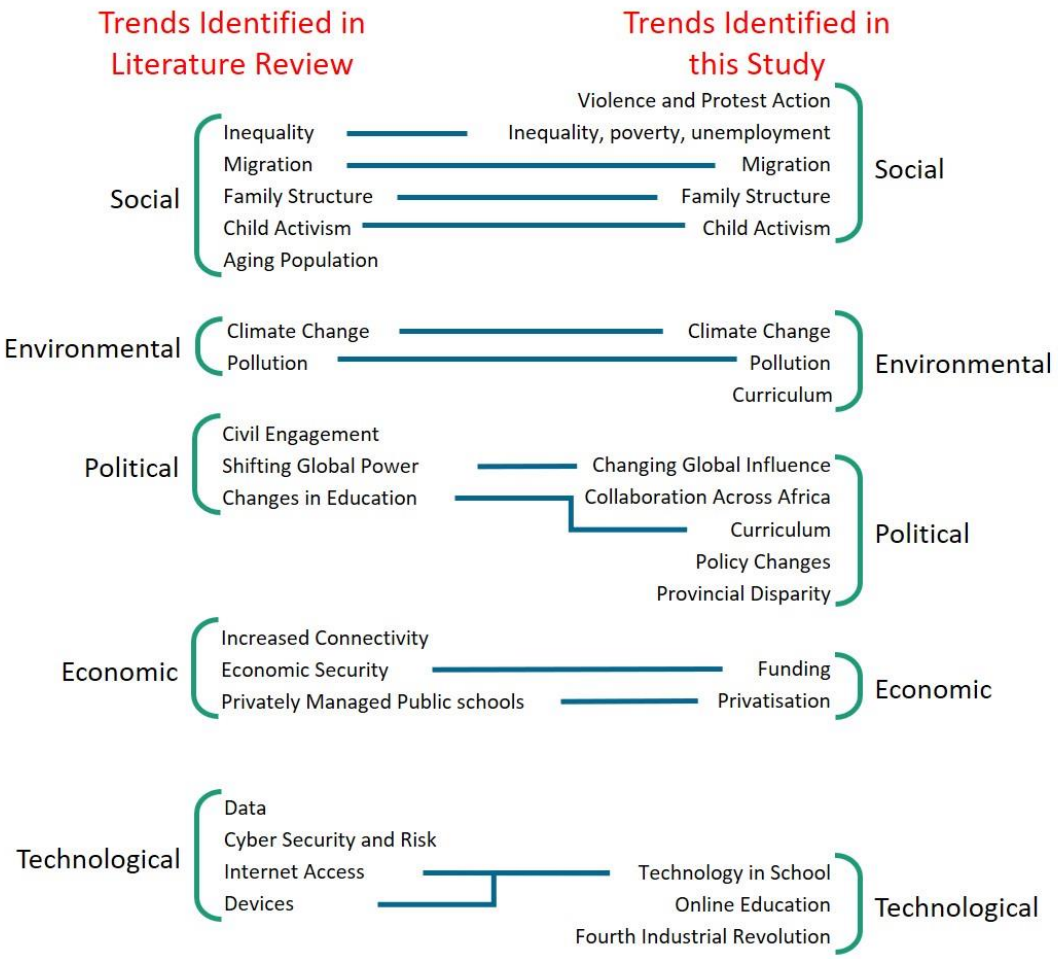

Figure 10: Comparison of Trends

6.1.1 Social Trends

Most of the social trends align. Examples of trends that align include, inequality, migration, changes in family structure and child activism. Two social trends that do not apply to South African are ageing and violence. The South African population is not ageing in-line with OECD countries. The increase in violence in school is unique and notable, as this trend may not apply, or at least not as broadly, in other countries. Further research is required to evaluate if violence in schools is increasing globally or only in specific contexts, such as under-resourced regions, countries or communities.

The DBE has acknowledged the increase of violence in schools but has not yet prioritised this challenge. In June 2019, the DBE released a statement on violence in schools, after a union called for teachers to be armed. The DBE is concerned about escalating violence, but Minister Angie Motesheka excluded this challenge from her top five priorities.

The DBE has, however, provided various alternatives to tackling violence. Police engagement, teaching pupils specific skills and values and increasing sports and recreational access for pupils are alternatives provided by the DBE to tackle violence. According to the DBE: the police are supposed to educate learners of the dangers of crime and violence and conduct random searches in schools to confiscate weapons or drugs; the Life Orientations curriculum is supposed to teach self-discipline, responsibility and respect; and 2500 sports hubs and clubs are supposed to receive equipment to keep learners away from destructive activities (DOE, 2019).

The DBE also calls for SGBs, parents and communities to play their part in tackling the problem. SGBs are urged to enforce school code of conduct, parents are urged to maintain learner discipline through regular dialogue, checking school bags, ensuring learner attendance and participating in parent meetings and community members are urged to reprimand children for not attending school (DOE, 2019).

According to the DBE, communities in which Education Forums have been established can minimise the disruption of learning and teaching and can tackle school safety challenges immediately. These Education Forums include representatives from all stakeholder groups (DOE, 2019). As this seems to be an effective mechanism to tackle

violence within communities, this model could be replicated across the country. To do so, important questions need to be answered: How could a community go about setting up an Education Forum? Who should lead an Education Forum? How can leadership capacity in Education Forums be developed? What could the role of district officials be in Education Forums?

To answer these questions and developed a structured process to scale these Education Forums across the country strong leadership is required. Some may argue that the challenge of school violence falls within the responsibility of the DBE, and this process must, therefore, be led by the DBE. Others may counter that the DBE alone is unable to quell broader community violence and shift this responsibility towards the police. Should violence continually escalate with no clear plan from the government, NGOs and civil society organisations may step in to close this gap. Regardless, violence in and around schools is a complex challenge whose scope is difficult to confine within the boundaries of governmental departments. Therefore, in my opinion, an intergovernmental task team may be the most appropriate to pilot and test integrated, cohesive solutions in partnership with NGOs, faith-based communities and other civil society organisations. Whoever ultimately leads this initiative will play a vital role in the South African education system.

6.1.2 Environmental Trends

The environmental trends of climate change and increased pollution cross borders and impact all nation-states in different ways. Drought and floods are affecting South Africa, specifically, as highlighted in this study. Climate change mitigation and adaptation is currently not a priority in South Africa and is discussed in detail in this section, also because it was a focus area in the MPhil in Engineering for Sustainable Development.

The NDP and the president acknowledge the importance of climate change. In the NDP identifies climate change as a key trend impacting South African (NPC, 2009). In his June 20th SONA, President Cyril Ramaphosa stated:

> “We are confronted by the most devastating changes in global climate in human history. The extreme weather conditions associated with the warming of the atmosphere threaten our economy, they threaten the lives and the livelihoods of

> our people, and – unless we act now – will threaten our very existence" (Ramaphosa, 2019).

However, climate change mitigation and adaptation strategies are currently not specifically included in medium or long term planning. In the June 20 SONA, President Cyril Ramaphosa set seven priorities, which do not include climate change mitigation or adaptation strategies. Additionally, Minister of Basic Education Angie Motsheka, recently stated in her department budget vote that the design of schools built will be reviewed, these "designs must be appropriate for teaching and learning; and be appropriate for the provision of digital infrastructure" (Motshekga, 2019). In this statement, she is highlighting the importance of digital infrastructure but is overlooking the need for infrastructure that will support schools affected by extreme weather conditions. For example, drought-affected areas will require secondary water supplies or rainwater harvesting infrastructure and flood-affected areas will require safe stormwater drainage solutions for schools and transport infrastructure.

Many of the interviewees, who represent various organisations at leadership levels, shared the sentiment that the climate was not a priority for South Africa, especially compared to unemployment and equality. These statements demonstrate the limited acknowledgement that climate change and the resulting floods and drought could exacerbate the already existing inequality, affecting vulnerable populations the most. The negative impact of climate change on education provision due to the food, water and housing security risk it poses, was recognised by only two of the twelve participants. This indicates a lack of awareness for this topic, which may in turn be the reason that is not being prioritised.

Given these findings, it is of the utmost importance that climate change adaptation and mitigation is urgently prioritised in South Africa. Beyond acknowledging climate change, it is imperative to develop integrated medium and long term plans to tackle the far-reaching implications of climate change, including the impact on the education system.

6.1.3 Political Trends

This study demonstrated that some broader global trends are impacting South Africa. Examples include the global shift in power and the increased influence of China. However, the educational trends of large scale curriculum changes and holistic approaches to education, such as project based learning and the removal of subjects, based on Steiner, Montessori or similar philosophies, are not being implemented in South Africa. The DBE has rather chosen to implement a three-stream curriculum and additional subjects such as coding and robotics. The DBE's divergence from these global trends may stem from the negative repercussions the implementation of the Outcomes Based Education curriculum had in South Africa. Trends regarding the changes in voter participation and civic engagement may apply in South Africa as well but were not highlighted by participants in this study. Similarly, the increasing disparity of provincial education learning outcomes, as well as increased continental collaboration may apply elsewhere, but further research is required to address these questions.

6.1.4 Economic Trends

Most global economic trends affect South Africa as well, but were not necessarily highlighted by interviewees. Increased connectivity and decreased economic security all affect South Africa but were not specifically mentioned by interviewees. The NDP highlights that increased connectivity of markets is affecting South Africa and the decline in economic security was only implied by various participants in the study. For example, fears around increased unemployment due to the fourth industrial revolution and the implications of an economic recession point towards decreased economic security. The global trend of privatisation was mentioned in this study. Two examples of privatisation in South Africa are the introduction of privately managed public schools and the increase in low-cost private schools. Further research is required to confirm if the increase in low-cost private schools is a unique trend to South Africa or more broadly applicable.

6.1.5 Technological Trends

Global trends around technology changes are impacting South Africa, but are being discussed very differently. Participants in this study focused on the fourth industrial revolution, online education and technology in schools, while the literature focused on particular technological changes such as increased internet access, increased use of data, increased cybersecurity risk and increasing divergence in devices.

This research highlights that while technology in schools is a major priority in South Africa, the risks that arise due to technology are not being discussed or planned for. In this study, most participants highlighted the opportunities that could arise from technology use, with only one participant highlighting the importance of data security and the risk of surveillance. Similarly, the white paper on e-education, which provides the governmental framework for implementing technology in schools, does not include considerations regarding the risks of technology (Department of Education, 2004).

Globally, risks associated with technology have recently come to light. For instance, data security and surveillance concerns have resulted in the German federal state of Hessen strongly advising against the use of Microsoft Office 365 in schools (Oates, 2019), the advent of social media has resulted in “fake news” spreading rapidly (Ordway, 2017) and data may have been misused to influence both the American and Brexit elections (Scott, 2018). Other risks include cyber-bullying and the decline in the safety of children as predators can reach children through the internet. In implementing technology it is imperative to plan for and manage these risks in the future.

Additionally, beyond providing children with access to technology, the curriculum should incorporate these elements of risk. Each child should learn about the risks related to ICTs and be taught appropriate skills to mitigate and manage these risks, a view shared Padayachee and Kritzinger (2010), who advocate for this to be incorporated in the Life Orientation curriculum.

6.2 Key Actors

This study also highlighted that there is agreement on who the most important actors are, but divergent views on what key actors should do. Overall, participants agreed that the state, unions, private sector and civil society (including NGOs and faith-based communities) play an important role in the education system. However, participants expressed differing views on the role and responsibilities stakeholders should have.

These differing interpretations can easily lead to conflict and could hamper collaboration. Especially the relationship between the DBE and PDEs could deteriorate as policy and responsibilities are interpreted differently.

7 Conclusion

This section provides an overview of the key findings, which are followed by a discussion on the limitations of this study and the possibilities for future work. The section ends with some policy-relevant recommendations.

7.1 Key Findings

Key trends that could impact the South African education system include technology, climate change, violence in and around schools, privatisation and a decrease in funding. For the complete list of trends that could impact the South African education system see Figure 11.

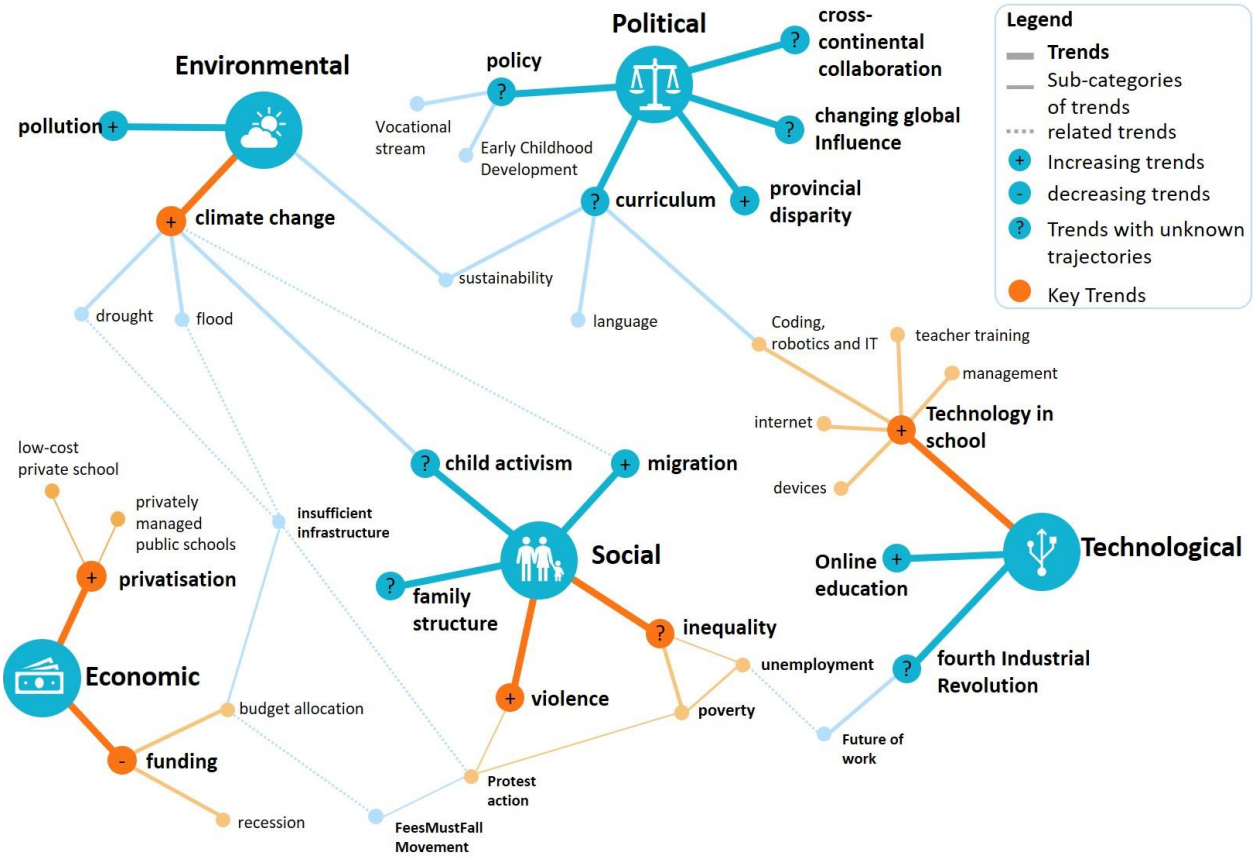

Figure 11: Overview of Trends

Collaboration and technology were identified as key opportunities. Technology and climate change pose major risks that are not being planned or accounted for. Risks linked to technology include data protection, cyberbullying and the spread of misinformation. Climate change could negatively impact the education system as food, water and housing security diminishes and natural disasters damage school infrastructure. The state, labour force, private sector and civil society organisations are key stakeholders who could influence the education system and react to these trends. This study highlighted that there is a broad consensus on who the most important stakeholders are, but not on what these stakeholders should do.

7.2 Limitations of this Study

The type of participants, interview structure and scope and are some of the limitations of this study.

The results of this study may not be fully exhaustive as the individuals that ultimately agreed to participate in this study represent a location, age, ethnicity and language bias. For example, participants commented on specific developments in Gauteng, the Western Cape and KwaZulu Natal. Thus, participants' experiences most probably concentrate on these regions. There is a possibility that trends that are only applicable to any of the other six provinces may have been overlooked. Furthermore, the 12 interviewees represent an age, ethnicity and language bias: only four of the twelve interviewees are people of colour; only four were below the age of 40 and all were fluent in English. The sample population thus excluded a broader demographic of students, parents or community leaders with limited English fluency. Including this broader demographic would strengthen the results of this study. Lastly, the sample population included only one interviewee who has worked within the Department of Education. Including representatives from each of the different provinces as well as the national department would strengthen the findings of this study.

The identified trends, opportunities and risks are not exhaustive. In the context of a master's thesis, the time allocated to the interviews was appropriate. However, further interviews would need to probe details for each trend and would lead to a more exhaustive list of risks and opportunities. To validate the findings of this research and identify any

missing trends, a survey could be conducted, followed by further interviews to clarify new suggestions arising from the survey.

The scope excluded considerations linked to health. The health and nutrition of a child play an important role in their learning, especially in foundation phase years. Important trends applicable to South Africa specifically, for example, HIV/Aids, malaria and child malnutrition, are important considerations that should also be included when planning for the future.

7.3 Future Work

This research has been fruitful in answering the research questions and could be expanded in a variety of ways: i) the study could be expanded to include more participants, group workshops and expansive literature reviews; ii) the scope could be increased to include health; iii) the CLD could be expanded into a stock and flow quantitative mathematical model and used to predict future scenarios. This model could also be used to determine which trends and interventions could have the most far-reaching impact; iv) the trends identified in this study could be quantified and disaggregated per province, to assist PDE in concrete short, medium and long term planning; v) Opportunities and risks for each trend could be expanded through further research; and vi) the actors and their roles and responsibilities could be investigated for coherency, applying the thinking of Pritchett (2015).

7.4 Policy-relevant Recommendations

This study confirmed that achieving quality education for all is a wicked problem that no single stakeholder group can tackle in isolation. The successful collaboration between the state, the unions, the private sector and civil society is critical to achieving significant improvements in learning outcomes in South Africa.

Tackling violence within communities is a multi-faceted, complex problem. Partnering with existing community groups, such as faith-based organisations, the Department of Social Services and the South African Police Service, would appear to be a viable strategy to create holistic, context-specific solutions.

Updated norms and standards for school infrastructure need to include climate-related infrastructure requirements such as stormwater drainage solutions and rainwater harvesting infrastructure. This could be the first step towards building climate-related infrastructure. Civil society organisations may need to play a crucial role in advocating for this requirement to the DBE.

It would seem important for to DBE to leverage technology to improve in-service teacher training and school data collection. Rather than building costly multimedia centres, the state should invest in mobile technology centres that can service multiple schools. Additionally, much more focus is needed on the education of risks related to technology. This could be included in the Life Orientation Curriculum. An interesting social media and television campaign may, however, be a lot more effective. The private sector could play an important role in creating and funding such a campaign.

In closing, I hope the findings of this study will assist stakeholders in decision making and will inspire further research in this field.

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Appendix A

Participants

	Type of Interviewee	**Affiliated Organisation**
Lorna Balie	Academia	Cape Peninsula University of Technology
David de Korte	Professional Association	South African Principals' Association (SAPA)
Paul Colditz	SGB	Federation of Governing Bodies of South African Schools (FEDSAS)
Micheal Gastrow	Academia	Human Sciences Research Council |(HSRC)
Leanne Jansen-Thomas	NGO	Equal Education
Basil Manuel	Union	National Professional Teachers' Organisation of South Africa (NAPTOSA)
Mary Metcalfe	State	Previous MEC for Education (Gauteng)
Noncedo Madubedube	NGO	Equal Education
Sizwe Nxasana	NGO	National Education Collaboration Trust (NECT)
Nic Spaull	Academia	University of Stellenbosch
Louise van Rhyn	NPO	Symphonia for South Africa | Partners for Possibility
Michael Young	Academia	University College London

Appendix B

Interview Instrument

Hi, my name is Heidi and I am from the University of Cambridge Engineering Department. Thank you for taking the time to meet with me today. This interview will help form part of the research I am carrying out as part of my MPhil in Engineering for Sustainable Development dissertation that aims to better understand various elements shaping the South African education system of the future. You have been selected to participate due to your experience and knowledge of the sector and are invited to share your views and knowledge to the best of your knowledge.

The Interview should take around 50 minutes. All the information discussed today will remain confidential. The interview will be transcribed and analysed - the interview transcript will only be linked to you as a password-protected file stored on my personal computer. The Interview recordings will be destroyed once the interviews have been satisfactorily transcribed and the interview transcript will be destroyed once the study has been published. I will combine information from all my interviews to prepare a report that reflects what I have found. While direct quotes may be used in my published research - your name will only appear should you have explicitly requested for attribution in the consent form. Otherwise, your anonymity will be ensured, and your participation will be recognised in a participant table, should you have given permission to do so in the consent.

This is a semi-structured interview. The main aim is to hear your views and interpretations; therefore my input will be kept to a minimum. The interview consists of 4 main questions with each question containing several sub-questions. Please feel free to explain your answers fully and ask for any clarification, or for me to repeat the question. Just so you are aware, there may be some minor overlap in the questions. I will keep track of the time and let you know if we need to move along.

Do you have any questions before I begin? Are you still comfortable with the interview being recorded?

Question 1 - Introduction & warm up

What is your field of expertise in the education sector of South Africa?

Question 2A - National Trends

What national trends will impact the South African education system in the next 10-15 years?

Probes:

1. What ***political*** trends could impact education?
2. What ***environmental trends*** could impact education?
3. What ***social trends*** could impact education?
4. What ***technological trends*** could impact education?
5. What ***economic trends*** could impact education?

Question 2B

Which ones of these trends have particular risks or opportunities associated with them?

Probe specific trends participant has mentioned have mentioned above

Question 2C

a) Who are the local actors that could have the biggest impact on (above) trends and how do you foresee their role playing out?

Probes: What influence/impact could (insert party) have:

- National DBE/DHET and Provincial Department of education
- Trade unions and/or teachers
- School Governing Bodies and SGB associations
- Parents
- Private sector
- NGO sector
- International Organisation (multilateral or bilateral)

Question 3A - Global/regional Trends (“transnational”)

a) What global or regional trends do you think could impact South African education system?

Probes:

6. What ***political*** trends could impact education?
7. What ***environmental trends*** could impact education?
8. What ***social trends*** could impact education?
9. What ***technological trends*** could impact education?
10. What ***economic trends*** could impact education?

Question 3B - Risks and Opportunities

Which ones of these trends have particular risks or opportunities associated with them?

Probe specific trends participant has mentioned have mentioned above

Question 3C

b) Who are the global actors that could have the biggest impact on (above) trends and how do you foresee their role playing out?

Question 4

Anything else that you would like to add? Anything that we haven't covered?

Thank you!

Appendix C

Examples of Coding

Funding	Internet Access	FeesMustFall	SOE	Climate Change
Budget	Wifi	Fallist Movement	Eskom	Global Warming
Rand	connectivity	student protests	SAA	Sustainability
Money	broadband			Environmentalism
Cost				
Financial				
Treasury				
Expense				